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Abstract. The main idea of the project work considered in this article is the creation of a unique world-class equestrian complex that meets the high standards of horse maintenance, training and rehabilitation, in Yekaterinburg (Russia, Sverdlovsk region). The article discusses the problems of modern hippological centers, trending growth areas based on the 'soft methods of education' theory – an alternative to the principles of sports and leisure complexes organization, requiring special approaches to the relationship between the horse and the man, new methods and techniques of realization. Technological and functional processes defining the peculiarities of the structural organization and architectural and planning solutions of these complexes are determined within the lines of the hippological science; new aspects and criteria for their development take shape, including the issues of ecological education in modern society

1. Introduction

Architecture is, perhaps, the most versatile and all-encompassing area of professional activity, which is indirectly, in one way or another, connected with any status of each individual, be it industrial employment, a social or household sphere. In all areas of our lives we are surrounded by buildings and structures, they form the space where we live, work, learn, relax. In any case, in the center of each of the architectural problem and the adopted concept is and will be the MAN, in all his manifestations; that is why the first thing to consider when designing buildings must be all the conditions for comfortable and safe existence and professional activities [1-3].

An equally important task of architecture was, is and will be its role in the moral education of humans, which is especially important today. Among the factors that determine the modern conceptual approach to architectural design in general and for each particular building or complex, a significant role is played by social, psychological, historical, environmental factors [4,5].

2. Development of hippological centers

In this regard, we can distinguish a separate group of buildings, these are complexes and centers for the maintenance, rehabilitation and education of animals [6]. This topic today is not just modern and relevant, it requires special and serious consideration [7]. Currently, the bulk of the 'equestrian world' is the equestrian sport and the athletes involved in such activities as show-jumping, horse dressage, horse racing, steeplechase etc. Methods of 'educating' and keeping animals in the commercial and entertainment sphere are not always humane in relation to animals. And if we are talking about the fate

of the horse – about its education, rehabilitation and life next to a person, this requires new methods and approaches, including the design of architectural and planning objects for the appropriate purpose [8-11].

2.1. The relationship between a man and a horse

Special interest and attention, as well as great social responsibility, is the basis for the proper development of the relationship between a man and a horse. We do not cease to love a horse for its grace, natural beauty, power and should see it as a friend, helper and part of the nature around us. Today horse breeding is a wide field of activity for all professionals in this field and just lovers and connoisseurs of horses. This field should have a full tandem – MAN and HORSE. Actually, this parity is the basis of a direction, rather new for many countries, in the field of horse breeding: 'soft methods of education' [12].

The essence of this direction lies in recognizing the personality of the horse, the right choice between freedom and the traditional service to man, the development of mental and physical abilities of the animal without pressure, and, finally, in the education of a loyal friend. At the same time, a person in the process of training a horse goes through the process of education, including moral and environmental education, and, more importantly, learns to be a leader. In addition, communication with animals, especially with horses, is actively used in a number of medical rehabilitation and educational programs, and today hippotherapy successfully works (therapeutic horse riding).

In the equestrian world there are several ways of working with a horse: professional sports including, among the basic types, different disciplines (Western, Polo, etc.), organization of leisure, amateur and recreational training, so-called 'soft methods' of working with horses. Even 10-15 years ago, we could not even imagine that this direction already existed in the world [13].

2.2. 'Soft methods' of working with horses

More recently supporters and enthusiasts of 'soft methods' of working with horses appeared in Russia as well. The essence of this direction is as follows:

- understanding a horse's anatomy, physiology, psychology and biomechanics;
- training a horse occur predominantly on the ground – 'on equal terms' – 'with hands';
- a soft approach, without the use of force and rudeness, excluding pain;
- training non-standard riding skills;
- training is based on the principle of good will, the desire to communicate with the person;
- the principle of leadership of a person.

The main problem in the organization of such centers is that the existing complexes do not guarantee proper conditions for keeping animals in line with this approach, they are also not designed for training: as a rule, there is no specialized equipment or the required functional premises. For the development of this direction not just enthusiasts and animal lovers are needed, but a whole system of diverse knowledge and a sound approach that is actually originally a science that studies the horse - hippology [14, 15]. In other countries, this direction is actively developing and there are already similar centers. Our country, according to data for 2010 on a livestock of horses, takes the 8th place in the world (1,505,000 animals). In Russia, the number of equestrian clubs, complexes and private stables is growing, all the known trends in horse breeding are developing, including new ones. Needless to say that the successful future of hippological rehabilitation centers as a developing modern and humane concept, requires the involvement of architects and designers in this interesting and very relevant topic, the development of special knowledge, special space-planning principles, taking into account a number of specific issues [16,17].

3. The project of hippological center 'Zelenyi Bor' in Yekaterinburg (Russia)

As an illustration to the development of this topic, it is proposed to consider the author's project of the hippological center in Yekaterinburg, made at the Institute of Construction and Architecture of the Ural Federal University. The authors of the project sought to draw attention to the urgent problem –

the relationship between a man and a horse, so we hope that the proposed topic will also be promising for practicing landscape architects.

The goals and objectives of the work were determined, first of all, by the specific problems of the developing direction of hippological centers design in the cities of Russia. Unfortunately, the equestrian centers of Yekaterinburg lack adequate conditions for keeping horses in line with the method of 'soft education', and there are no qualified coaches. Often there is no opportunity for organizing seminars, lectures or demonstrations, and there is not enough space for training in this area. It is logical to assume that with the development of the network of centers in a competitive environment and taking into account the competent organization of the whole system, its development and centralization, new prospects will open, including for the methods of "soft education" and that is especially attractive for "hippotherapy". But the main problem in this field is that today there is no common system and functional structure for the organization of such complexes.

This has ultimately determined a number of project tasks, for which it is necessary to ensure the following:

- competent maintenance of horses, including private owners, taking into account all regulatory requirements and technological specifics;
- education and training of horses, taking into account the new methodology in open spaces and indoors;
- holding intra-club and 'open' competitions, demonstrations, master classes, as well as the possibility of seminars and conferences of specialists;
- creation of optimal conditions for everyone in maintaining sports shape, pleasant and useful leisure activities in an ecologically clean natural area, including hippotherapy sessions, psychological and physical training under the supervision of specialists;
- comfortable working conditions for specialists and staff;
- solving engineering and design issues in terms of safety, ecology, environmental comfort and sustainable development.

The aim of the project is to develop an architectural and structural design taking into account a number of rules and requirements for this type of structures, while considering current trends, new aspects and approaches to the problem, and most importantly, to identify the main criteria for the design of such hippological complexes.

The hippological center is supposed to be located near the village of Zelenyi Bor, in the city of Yekaterinburg, at the site separated from the village by a 400-meter wide sanitary protection zone with green plantings and with entrance from the side of Verkhnyaya Pyshma and EKAD.

3.1. The functional solution

The idea of the compositional and planning solution was to combine all the necessary components (functional blocks) into a single interrelated model with a complex branched structure, which made it possible to loop the main ways of movement of people and horses, to provide technological separation of the main flows, while maintaining the autonomy for the functioning of individual blocks and convenient functional links between them. A closed planning 'circuit' successfully 'solves' the problems of the Ural climate (cold winters and rainy off-seasons), which provides comfortable working conditions for staff and horses, as well as the most rational solution for engineering communications and functional communications (Figure 1).

Several main blocks with all the necessary ancillary and utility services can be identified as part of a hippological center:

- an indoor arena with a public catering area, outdoor green recreation zone and several small information and lecture rooms;
- the service area includes, first of all, stables with stalls for 45 animals, a veterinary point with a quarantine unit;
- an administrative and hotel block for employees and staff, as well as for guests and invited specialists;

- a block with a pool for horses' medical swimming training sessions, located in the courtyard of the complex and conveniently linked with the stables.

Figure 1. Figure with short caption (caption centred).

In addition, on the territory of the complex there are all the necessary and well-arranged open planning zones, logically close to the corresponding functional blocks of the main volume and designed in accordance with fire protection norms, health, sanitary, veterinary and technological requirements:

- the training area includes two open arenas with stands for spectators, 'barrels' for training, spring-art, an 'agility' track;
- the paddock area (located with the shortest transition from the stables and back in mind), equipped with drinkers and sheds-shelters, meadows for walking and grazing horses (all daylight is used during the summer time);
- the paddock area (located with the shortest transition from the stables and back in mind), equipped with drinkers and sheds-shelters, meadows for walking and grazing horses (all daylight is used during the summer time);
- the utility zone includes warehouses for various purposes, sanitary and auxiliary facilities and buildings, garage cleaning equipment;
- at the entrance to the complex the necessary parking spaces for visitors and guests of the center are located.

A large indoor arena (36 x 60 m) with stands for 140 spectators and mezzanine floor to monitor the performance and training with access to the accessible roof and a convenient connection with the restaurant hall. On the eastern side of the arena there is a wooden platform-deck for spectators with the opportunity to review the activities in the open arena and the organization of a summer cafe with protective rollers. Thus, indoor and outdoor arenas make up a single entertainment and training unit and are conveniently linked, which allows you to use them most efficiently: simultaneously and independently.

An important part of the hippological center is its public part, which includes a multifunctional hall for conferences and exhibitions, video and lecture halls, a restaurant hall [18, 19]. The multi-purpose usage of the internal space is provided by the possibility of its transformation. The possibility of renting and using the premises of the halls for various countryside events partially solves the problem of self-sufficiency of the center and the redistribution of funds received in favor of its main purpose; the complex is to some extent a commercial enterprise. The administrative and hotel block is conveniently connected to the public block by a two-storey glazed transition in two levels, which

visually opens the courtyard with a swimming pool from the main entrance to the center, and the accessible roof is a continuation of the outdoor recreation area of the indoor arena.

One-storey stables are oriented with a deviation from the north by 30 and 60 degrees, which is recommended by the regulations, and it became possible due to such a configuration of the courtyard and the location of the buildings. The feature of the planning and technological solution of stables lies in installing a hatch for cleaning waste products and dirty litter in each stall, discarding them to the conveyor belt under the floor towards a special container and then for transportation to the waste warehouse and their further use with the addition of phosphogypsum. It is important that all waste manipulations are carried out in the warehouse outside the stables.

3.2. The structural solution

The task of the project was not only to develop a competent functional solution, to create a comfortable space and to reconcile all the contradictions arising in the process of work, but also to create a typologically recognizable and expressive image in terms of architecture. Particular attention was paid to the choice of building structures and finishing materials, considering, among other things, their modernity, environmental friendliness, appropriateness; traditional and new architectural techniques to create an aesthetic appearance, so that the structure remains 'recognizable', at the same time appearing peculiar (Figure 2).

Taking into account all the factors, glued wooden structures were chosen as the main bearing elements, in particular for the volume of the indoor arena - glued wooden frames with a span of 36 m, delivered in increments of 5 m [20]. In other buildings - a wooden frame made of glued timber. For self-supporting exterior walls a natural and environmentally friendly material was chosen: a 'geokar' block, which has a number of advantages: environmental safety, excellent bactericidal properties, ease of processing, resistance to rot and spoilage by rodents, low cost and geographical availability of its production from the site, good thermal properties. For additional protection against fire and heat loss, it is proposed to treat the internal and external walls with fire- and heat-resistant 'Teplover' plaster, which is also sound-absorbing and aesthetic enough for facades and interiors. The use of 'geokar' blocks and 'Teplover' plaster eliminated the need for additional warming of external walls. The use of natural stone in the form of flagstones and elements made of wooden finishing slats and stationary blinds is also traditional for this type of buildings. For roofing a modern and high-quality material was selected: polymer membrane. This material is relatively light, resistant to precipitation with a high degree of fire resistance, convenient and safe for installation, which can be carried out at any time of the year, in any weather at a speed of 3-5 meters per minute.

Figure 2. View of the main entrance to the hippological center.

In the pitched roofs of the indoor arena and the public block there are large areas of overhead glazing. This is dictated by the need to provide natural soft, diffused lighting, primarily in the hall of

the arena. In addition, taking into account the adopted space planning solutions and regulatory requirements, the implementation of side lighting, especially from the eastern facade, has become impractical. The use of low-emission glass, which with excellent transparency transmits useful solar radiation and reflects thermal infrared radiation, in this case is justified. In addition, this glass has better thermal properties than traditional glass. The compositional design of the roof glazing creates an expressive, so-called 'fifth' facade for the whole complex, which in the case of pitched roof solutions is a very important aspect.

4. Conclusion

This project comprehensively reflects the desire to solve one single problem: creating an environment for communication between a man and a horse, based on a fundamentally new methodology, a new worldview that requires careful attention, among other things, to the issues of ecology and sustainable development in the design of such buildings. The relevance of the problem determined the goals and objectives of the project, which allows us to assess the attempt to present a thesis proposal to address a number of serious issues of design, technology, functional organization, an esthetic perception – all that is the essence of architectural and structural design.

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